LABORATORY AND ENCLOSURE EFFICACY STUDIES OF ZINC PHOSPHIDE FOR CONTROL OF *MICROTUS*

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Abstract:

Zinc phosphide (Zn_3P_2) is an acute rodenticide with application to the control of various vole species in agricultural crops. Its toxicity is attributed to the release of phosphine (PH_3) during hydrolysis induced by contact with stomach acids. Representative LD_{50}s of Zn_3P_2 (oral intubation) for voles range between 15.7 (*Microtus californicus*) and 18.0 mg/kg (*M. pennsylvanicus*).

Two issues surrounding the use of Zn_3P_2 to control voles include: the potential secondary hazards posed to avian and mammalian predators/scavengers by lethally-dosed voles and the control attained by large-acreage applications within grain or alfalfa crops. This presentation reports (1) a pilot study conducted to determine whole-carcass residues of Zn_3P_2/PH_3 in *M. pennsylvanicus* and *M. ochrogaster* that died following free ingestion of a 2.0% Zn_3P_2 steam-rolled-oats bait and (2) a study sponsored by the California Department of Food and Agriculture to assess efficacy of a single, ≈10 lb./acre broadcast application of such bait within 18, 0.5-acre enclosures holding an average of 24 introduced *M. canicaudus* at Hyslop Farm, Oregon State University, Corvallis, OR.

Key results showed: (1) acceptance of baits was excellent in both studies, (2) carcass recovery estimates of Zn_3P_2 and PH_3 ranged from 0.32 to 4.95 mg (≈50% of ingested amounts) and 0.5 to 21 μg, respectively, suggesting that predators/scavengers with LD_{50}s >20 mg/kg are at low risk of secondary poisoning, and (3) 94% versus 30% of the voles introduced to test- and control-bait enclosures, respectively, were not recaptured 14 days post baiting in the efficacy study.

[1,2] Collaborated on carcass-residue and enclosure-efficacy studies, respectively.